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PATENT APPLICATION
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In The United States Patent and Trademark Office
On Appeal From The Examiner To The Board
of Patent Appeals and Interferences

In re Application of:	Krishnadas C. Kootale
Serial No.:	09/825,083
Filing Date:	April 2, 2001
Group Art Unit:	2172
Examiner:	Monplaisir G. Hamilton
Title:	SYSTEM AND METHOD FOR ALLOCATING DATA IN A HIERARCHICAL ORGANIZATION OF DATA

Mail Stop: Appeal Brief - Patents
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Willie Jiles

Willie Jiles

Date: December 1, 2004

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Dear Sir:

Appeal Brief

Appellant has appealed to the Board of Patent Appeals and Interferences from the decision of the Examiner mailed September 21, 2004, finally rejecting Claims 1-3, 6-12, 15-21, 24-29, 31, and 33, all of which are pending in this case. Appellant filed a Notice of Appeal on October 6, 2004. Appellant respectfully submits this Appeal Brief with the statutory fee of $340.00.

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Real Party In Interest

This application is currently owned by i2 Technologies US, Inc., as indicated by an assignment recorded on April 2, 2001, in the Assignment Records of the United States Patent and Trademark Office at Reel 011669, Frames 0380-0381.

Related Appeals and Interferences

There are no known appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision regarding this appeal.

Status of Claims

Claims 1-34 are pending in this application. Claims 1-3, 6-12, 15-21, 24-29, 31, and 33 stand rejected pursuant to a final Office Action mailed September 21, 2004, and are all presented for appeal. Claims 4, 5, 13, 14, 22, 23, 30, 32, and 34 are objected to as being dependent upon a rejected base claim, but the Examiner has indicated these claims would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims. All pending claims are shown in Appendix A.

Status of Amendments

All amendments submitted by Appellant were entered by the Examiner before the issuance of the final Office Action mailed September 21, 2004.

Summary of Claimed Subject Matter

It is often desirable within a business or other planning environment to generate information regarding demand, available supply, selling price, or other data concerning a product or other item. Data for products may often be dependent in some manner on data for other hierarchically related products. For example, demand for a product with multiple components may drive the demand for a particular one of those components. Similarly, demand for products in a particular geographic region may drive the demand for the products in a particular territory in the region. Because of these hierarchical dependencies, the data concerning various products or other items may be stored hierarchically in data storage or derived in a hierarchical fashion. Furthermore, the data may be stored at a storage location associated with multiple dimensions, such as a product dimension (the storage location being associated with a particular product or product component), a geography dimension (the storage location being associated with a particular geographical area), and a time dimension (the storage location being associated with a particular time or time period). *Page 2, lines 1-15.* Figures 2 and 3 of the present Application illustrate example product and geography dimensions, respectfully.

It is often desirable to update product data by forecasting demand values or other appropriate values for a particular product or group of products. As an example, using the current and/or past demand values associated with a particular product in a particular state, the demand for the product in that state at a time in the future may be forecasted. However, it may not be feasible or accurate to forecast demand values for the product in a particular region of the state or to forecast demand values for the product in the entire country in which the state is included. Instead, the demand value for the product in the particular state may be used to determine other hierarchically related demand values using allocation techniques. For example, the forecasted demand value may be allocated by aggregating it with demand values for the product in other states in the country to determine a demand value for the product in the entire country. Alternatively, the demand value may be allocated by disaggregating it to determine a demand value for the product in each of the regions of the state. However, many current allocation methods do not provide a sufficiently accurate allocation of forecasted values and thus negatively affect demand planning, supply planning, or other planning based on the allocated values. *Page 2, lines 16-31.*

Unlike previous data allocation techniques, embodiments of the present invention account for the variance of data values associated with a storage location in a hierarchical database or other organization of data when allocating a value to that storage location based on the forecasted value of a hierarchically related storage location. Therefore, the present invention provides a more accurate allocation than previous techniques. Furthermore, embodiments of the present invention also take into account multi-dimensional relationships between storage locations in a multi-dimensional hierarchical organization of data when allocating forecasted values. *Page 3, lines 14-22.*

FIGURE 1 of the Application illustrates an exemplary system 10 for allocating data, such as forecasted data, in a hierarchical organization of data associated with a business or other planning environment. As described below, system 10 implements an allocation strategy that may be used to allocate a value associated with a particular data member in a data storage device or in a representation of data to hierarchically related data members. *Page 5, lines 1-7.* System 10 includes client 12, server 14, and data storage 16. Client 12 may include one or more processes to provide appropriate administration, analysis, and planning input. Although these processes are preferably separate processes running on a dedicated client processor, embodiments of the present invention contemplates these processes being integrated, in whole or in part, and running on one or more processors within the same or different computers. Similarly, the server 14 may include one or more processes to receive administration, analysis, and planning input from client 12 and interact with data storage 16 to provide corresponding output to client 12. *Page 5, lines 20-27.*

Data storage 16 may be hierarchical in nature, may be multi-dimensional, and/or may provide persistent data storage for system 10. For example, data storage 16 may be a multi-dimensional database that stores data in a hierarchical and multidimensional format or data storage 16 may be a representation of data derived by server 12 or other appropriate component from data stored in a relational database, in memory, or in any other appropriate location. In an example embodiment, data storage 16 includes three-dimensional data and, for each data measure, associates with each storage location 18 a particular member from the product dimension, a particular member from the geography dimension, and a particular member from the time dimension. Each of these particular combinations of members of these three dimensions is associated with a corresponding storage location 18 in data storage

16, similar to each combination of coordinates from the x, y, and z axes being associated with a point in three-dimensional Euclidian space. Furthermore, position within a particular dimension may be changed independent of members of other dimensions, much like the position of a coordinate along the x axis may be changed independent of the positions of other coordinates along the y and z axes in three-dimensional Euclidian space. *Page 6, lines 2-20.*

In the three-dimensional embodiment described above, the values of the data measures within the set for a particular storage location 18 depend on the combined positions of members within product, geography, and time dimensions for that storage location 18. As a result, the values of the data measures typically vary with these combined positions as appropriate to accurately reflect the demand, available supply, selling price, or other data associated with these members. When a suitable combination of members is specified in the product, geography, and time dimensions according to operation of system 10, data storage 16 accesses the data measures for storage location 18 associated with that combination of members to assist system 10 in allocating demand forecasts or other suitable data. *Page 7, lines 3-13.*

For example, referring to the members of the product and geography dimensions of an organization of data as illustrated in Figures 2 and 3, respectively, the data measures associated with each member 54 or 74 are an aggregation of the data measures associated with some or all of members 54 or 74 in lower levels 52 or 72 within the same hierarchy of parent-child links 56 or 76. Therefore, given forecast data for a member 54 or 74 (a parent) at one level 52 or 72, the forecasts for each of the related members 54 or 74 in the next lowest level 52 or 72 (the children of the parent) may be determined by disaggregating the forecast data for the parent between the children. Furthermore, although the terms "parent" and "children" are used above to identify a relationship between members 54 or 74 of a single dimension 50 or 70, these terms may also be used to refer to the relationship between data measures or values associated with a storage location 18 associated with a member from each of a number of dimensions. For example, a storage location 18 that includes a demand value for a particular product in a particular state may be hierarchically related to a storage location 18 that includes a demand value for the product in a city of that state (the value associated

with the former storage location 18 being a parent of the value associated with the latter storage location 18). *Page 11, line 20 – Page 12, line 2.*

When allocating a forecast from one or more parents to their children, a "top-down" proportional allocation strategy is often used. In this strategy, the value of the forecast (such as a demand forecast) associated with a parent is divided proportionally among its children according to the relative current values (such as current demand values) associated with the children. Therefore, using such proportional allocation, children having larger values get a larger share of the number being allocated and children having smaller values get a proportionately smaller share. For example, if a parent with a forecasted demand of 1800 units has a first child that currently has an associated demand of 1000 units and a second child that currently has an associated demand of 500 units, then 1200 units of the forecasted demand would be allocated to the first child and 600 units of the forecasted demand would be allocated to the second child. *Page 12, lines 3-14.*

Top-down allocation, proportional or otherwise, may be used for many reasons. For example, forecasts that are estimated at a higher level 52 or 72 often are more accurate and a forecast planner may want to keep those values intact and adjust the forecasts at the lower levels 52 or 72 to agree with the higher level forecast. Alternatively, the forecasts at a high level 52 or 72 may be specified, such as objectives and targets, and the lower level forecasts are adjusted to achieve the target forecast at the higher level 52 or 72. However, proportional allocation is often too restrictive and may adversely affect the accuracy of the forecast values determined for children in the lower level 52 or 72. For example, a scenario where proportional allocation may create inaccurate forecasts is when the value associated with a child to which an estimated forecast is to be allocated has a relatively high variance (for example, the value varies widely over time). In this case, a proportional allocation based on the current value associated with the child (or based on an average of a selected number of past values) may be skewed by a temporary fluctuation in the value. *Page 12, lines 15-28.*

Embodiments of the present invention provide an allocation strategy that accounts for variance in the values associated with children when allocating a forecasted value from a parent of the children. Furthermore, it is possible for the values of the children to have positive or negative relationships between themselves, so that a higher value associated with one child may have a correspondence with a higher or lower value associated with another

child. The allocation strategy of the present invention may also account for these relations. *Page 12, line 29 – Page 13, line 3.* Various examples of equations and techniques that may be used to implement this allocation strategy are described in further detail at pages 13-24 of the present Application. However, the details of specific example equations, some of which are claimed in the present Application, are not particularly relevant on appeal since the claims reciting these specific equations have not been rejected by the Examiner.

Ground of Rejection to be Reviewed on Appeal

Appellant requests that the Board review the Examiner's rejection of Claims 1-3, 6-12, 15-21, 24-29, 31, and 33 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,991,732 to Moslares.

Argument

The Examiner's rejection of Claims 1-3, 6-12, 15-21, 24-29, 31, and 33 is improper, and the Board should withdraw the rejection for the reasons given below.

The Examiner's Rejection of Claims 1-3, 6-12, 15-21, 24-29, 31, and 33 Under 35 U.S.C. § 102(b) in Light of *Moslares* is Improper

The Examiner rejects Claims 1-3, 6-12, 15-21, 24-29, 31, and 33 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,991,732 to Moslares ("*Moslares*"). "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987); M.P.E.P. § 2131. In addition, "[t]he identical invention must be shown in as complete detail as is contained in the . . . claims" and "[t]he elements must be arranged as required by the claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989); *In re Bond*, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990); M.P.E.P. § 2131 (*emphasis added*). For the reasons given below, Appellant submits that *Moslares* does not disclose each and every element of the claims of this Application, and that these claims should thus be allowed.

Independent Claims 1, 10, 19, 28, 29, 31 and 33 Are Allowable Over *Moslares*

Claim 1 of the Application recites the following:

> A computer-implemented method for allocating data in a hierarchical organization of data, comprising:
> determining new values for one or more parents in the organization of data;
> determining current values for one or more children in the organization of data, each child being hierarchically related to one or more of the parents;
> determining the relationship between each parent and its children;
> determining a variation for each child; and
> determining a new value for each child by allocating the new values of the parents to the children based on the parent-child relationships, the current values of the children, and either the sum of the variations of the children or a matrix of the variations of the children.

Claims 10, 19, 28, 29, 31 and 33 recite similar, although not identical, limitations.

Moslares does not disclose each and every one of these limitations. For example, *Moslares* does not disclose, teach, or suggest that a new value for each child is determined by allocating new values of the parents to the children based on the *variations* of the children, much less based on either *the sum of the variations of the children or a matrix of the variations of the children*, as recited in Claim 1, and similarly in Claims 10, 19, 28, 29, 31 and 33.

Nowhere does *Moslares* disclose an allocation of a value from a parent to its children based on the variation of the children. At best, the citations to *Moslares* provided by the Examiner teach that a value (such as a demand value) of a parent may be directly associated with a child. For example, referring to the passages cited by the Examiner from columns 15 and 16 of *Moslares*, even assuming for the sake of argument that item "A" is a parent and items "B" and "C" are children, there is no disclosure that a value for item "A" is allocated to item "B" and/or item "C" based on the variation of item "B" and/or "C." To contrary, *Moslares* states that each of these items have a *fixed* relationship to each other. For example, there is a one-to-one relationship between items "A" and "B" such that a demand for item "B" is equal to a demand for item "A." *Column 16, lines 5-9*. *Moslares* does not disclose that any *variation of the children* is used in the *allocation* of a value from a parent to the children. Furthermore, *Moslares* certainly does not teach that a value for a child is determined by allocating the value for a parent based on *the sum of the variations of the children or a matrix of the variations of the children*.

In response to the above arguments, the Examiner made the following statement in the Final Office Action dated September 21, 2004:

> Examiner disagrees with applicant. Moslares explicitly discloses demand for a component item is defined as the demand that an item updates for its components items in every time period (col 14, lines 40-50). Moslares further discloses that the demand for the components must be adjusted by the ratio r_j,

> i.e., the number of component items necessary for producing a particular item (col 14, lines 40-65). Examiner maintains that the ratio element for each component represents "the sum off the variations of the children or a matrix of the variations of the children". Therefore, the claimed invention is unpatentable.

With respect to the first sentence, *Moslares* does disclose that demand for a component item is defined as the demand that an item updates for its components items in every time period. However, all *Moslares* is referring to with this statement is that the demand for an item affects the demand for the components that are used to make that item. It certainly does not disclose that a demand for each component item is determined by allocating a demand of the item to the component items based on either the sum of the variations of the component items or a matrix of the variations of the component items (this assumes the Examiner is equating the item to the recited "parent" and is equating the component items with the recited "children").

With respect to the second sentence in the Examiner's statement excerpted above, the fact that *Moslares* discloses the demand for the components must be adjusted by the ratio r_j (the number of component items necessary for producing a particular item) supports the Appellant's argument above that the demand for a component used to make an item has a fixed relationship with the demand for the item. As an example, *Moslares* states the following:

> In other words, if two units of a component item were necessary for producing each unit of the item, then the total value of the previous internal demand emitted will be multiplied by 2 to determine the number of components necessary for producing the item."

Column 14, lines 36-40. Therefore, it is evident from this disclosure that the value of demand for a child/component is determined by a fixed relationship (the ratio r_j) with the demand for the parent/item. This fixed relationship is the number of components required to produce the item. Contrary to the Examiner's leap of logic in the third sentence of his statement excerpted above, this ratio clearly does not represent "the sum off the variations of the children or a matrix of the variations of the children."

For at least these reasons, *Moslares* fails to anticipate Claims 1, 10, 19, 28, 29, 31 and 33 of the present invention. Therefore, Appellant respectfully requests reconsideration and allowance of Claims 1, 10, 19, 28, 29, 31 and 33, and all claims that depend from these independent claims.

Dependent Claims 7, 9, 16, 18, 25 and 27 Are Allowable Over *Moslares*

Claim 7 recites that "the organization of data" recited in Claim 1 "comprises multiple dimensions" and that "the parents and children are each associated with multiple dimensions of the organization of data." Claims 16 and 25 recite similar limitations. Furthermore, Claim 9 recites that the organization of data recited in Claim 7 "comprises at least two dimensions selected from the group consisting of a time dimension, a product dimension, and a geography dimension." Claims 18 and 27 recite similar limitations.

The Examiner states that these limitations are disclosed at Column 13, lines 1-25 of *Moslares*. However, Appellants fail to see how this passage from *Moslares* (or any other portion of *Moslares*) discloses an organization of data that comprises multiple dimensions and that the parents and children of such an organization of data are each associated with multiple dimensions. The cited passage refers to demand and indicates that this demand varies with time; however, this is not a disclosure of organizing data into multiple dimensions. There is simply no teaching of any multi-dimensional organization of data.

For at least this additional reason, *Moslares* fails to anticipate Claims 7, 9, 16, 18, 25 and 27 of the present invention. Therefore, Appellant respectfully requests reconsideration and allowance of Claims 7, 9, 16, 18, 25 and 27.

Dependent Claims 8, 17, 26 Are Allowable Over *Moslares*[1]

Claim 8 recites that in the organization of data recited in Claim 7, "the parents and children each represent a storage location within the organization of data that is uniquely identified by the positions of members in two or more of the dimensions." Claims 17 and 26 recite similar limitations. As described above, *Moslares* does not disclose an organization of data having multiple dimensions. It also clearly does not disclose at the passage or in the figure cited by the Examiner (Column 16, lines 40-60; Figure 4) storage locations within such an organization of data that are uniquely identified by the positions of members in two or more of the dimensions.

For at least this additional reason, *Moslares* fails to anticipate Claims 8, 17, and 26 of the present invention. Therefore, Appellant respectfully requests reconsideration and allowance of Claims 8, 17, and 26.

Dependent Claims 2-3, 6, 11-12, 15, 20-21, and 24 Are Also Allowable Over *Moslares*

Claims 2-3 and 6 depend from and thus include all the limitations of independent Claim 1. Claims 11-12 and 15 depend from and thus include all the limitations of independent Claim 10. Claims 20-21 and 24 depend from and thus include all the limitations of independent Claim 19. At least because they depend from a claim that has shown above to be in condition for allowance, each of these dependent is also in condition for allowance. Therefore, Appellant respectfully requests reconsideration and allowance of Claims 2-3, 6, 11-12, 15, 20-21, and 24.

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[1] In the Final Office Action, the text of the rejection makes a reference to *Lobley*. However, Applicants assume this reference was in error since this claim is rejected with the other claims under section 102 in view of *Moslares* and since the Examiner does not cite to any teaching of *Lobley*.

Conclusion

Appellant has demonstrated that the present invention, as claimed, is clearly distinguishable over the prior art cited by the Examiner. Therefore, Appellant respectfully requests the Board of Patent Appeals and Interferences to reverse the final rejection of the Examiner and instruct the Examiner to issue a notice of allowance of all claims.

Appellant has enclosed a check in the amount of $340.00 for this Appeal Brief. Appellant believes no additional fees are due. The Commissioner is hereby authorized to charge any fee and credit any overpayment to Deposit Account No. 02-0384 of Baker Botts L.L.P.

Respectfully submitted,

BAKER BOTTS L.L.P.
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Appendix A: Claims on Appeal

1. (Previously Presented) A computer-implemented method for allocating data in a hierarchical organization of data, comprising:

determining new values for one or more parents in the organization of data;

determining current values for one or more children in the organization of data, each child being hierarchically related to one or more of the parents;

determining the relationship between each parent and its children;

determining a variation for each child; and

determining a new value for each child by allocating the new values of the parents to the children based on the parent-child relationships, the current values of the children, and either the sum of the variations of the children or a matrix of the variations of the children.

2. (Original) The method of Claim 1, wherein the new values of the parents represent demand forecasts to be allocated to the children.

3. (Original) The method of Claim 1, wherein the variation of each child is calculated using statistical techniques based on the historical variation in the values of the child over a specified time period.

4. (Previously Presented) The method of Claim 1, wherein the new value of each child is determined using the equation:

$$\bar{x}' = \bar{x} + \Sigma \boldsymbol{R}^T (\boldsymbol{R} \Sigma \boldsymbol{R}^T)^{-1} (\bar{y} - \boldsymbol{R} \bar{x}),$$

in which $\bar{x}'$ comprises a vector of the new values of the children, $\bar{x}$ comprises a vector of the current values of the children, Σ comprises a matrix of the variations of the children, $\boldsymbol{R}$ comprises a matrix identifying the parent-child relationships, $\boldsymbol{R}^T$ comprises the transpose of $\boldsymbol{R}$, and $\bar{y}$ comprises a vector of the new values of the parents.

5. (Original) The method of Claim 1, wherein the new value of each child is determined using the equation:

$$\bar{x}'_i = \bar{x}_i + \frac{\sigma_{i,i}}{\sum_i \sigma_{i,i}} (\bar{y} - \Sigma_i \bar{x}_i),$$

in which $\bar{x}'_i$ comprises the new value of the child i, $\bar{x}_i$ comprises the current value associated with a child i, $\sigma_{i,i}$ comprises the variation of the child i, $\Sigma_i \sigma_{i,i}$ comprises the sum of the variations of the children, $\Sigma_i \bar{x}_i$ comprises the sum of the current values of the children, and $\bar{y}$ comprises the new value of the parent of the child i.

6. (Original) The method of Claim 1, wherein:

the organization of data comprises one or more dimensions; and

the parents and children are all members of the same dimension within the organization of data.

7. (Original) The method of Claim 1, wherein:

the organization of data comprises multiple dimensions; and

the parents and children are each associated with multiple dimensions of the organization of data.

8. (Original) The method of Claim 7, wherein the parents and children each represent a storage location within the organization of data that is uniquely identified by the positions of members in two or more of the dimensions.

9. (Original) The method of Claim 7, wherein the organization of data comprises at least two dimensions selected from the group consisting of a time dimension, a product dimension, and a geography dimension.

10. (Previously Presented) A system for allocating data in a hierarchical organization of data, comprising:

data storage including:

one or more parents having associated values; and

a plurality of children having associated values, each child being hierarchically related to one or more of the parents; and

a server coupled to the organization of data and operable to:

receive a new value for one or more of the parents;

receive a current value for one or more of the children;

receive an identification of the relationship between each parent and its children;

receive a variation for each child; and

determine a new value for each child by allocating the new values of the parents to the children based on the parent-child relationships, the current values of the children, and either the sum of the variations of the children or a matrix of the variations of the children.

11. (Original) The system of Claim 10, wherein the new values of the parents represent demand forecasts to be allocated to the children.

12. (Original) The system of Claim 10, wherein the variation of each child is calculated using statistical techniques based on the historical variation in the values of the child over a specified time period.

13. (Previously Presented) The system of Claim 10, wherein the server is operable to determine the new value of each child using the equation:

$$\bar{x}' = \bar{x} + \Sigma \boldsymbol{R}^T (\boldsymbol{R} \Sigma \boldsymbol{R}^T)^{-1} (\bar{y} - \boldsymbol{R} \bar{x}),$$

in which $\bar{x}'$ comprises a vector of the new values of the children, $\bar{x}$ comprises a vector of the current values of the children, Σ comprises a matrix of the variations of the children, $\boldsymbol{R}$ comprises a matrix identifying the parent-child relationships, $\boldsymbol{R}^T$ comprises the transpose of $\boldsymbol{R}$, and $\bar{y}$ comprises a vector of the new values of the parents.

14. (Original) The system of Claim 10, wherein the server is operable to determine the new value of each child is determined using the equation:

$$\bar{x}'_i = \bar{x}_i + \frac{\sigma_{i,i}}{\sum_i \sigma_{i,i}} (\bar{y} - \Sigma_i \bar{x}_i),$$

in which $\bar{x}'_i$ comprises the new value of the child i, $\bar{x}_i$ comprises the current value associated with a child i, $\sigma_{i,i}$ comprises the variation of the child i, $\Sigma_i \sigma_{i,i}$ comprises the sum of the variations of the children, $\Sigma_i \bar{x}_i$ comprises the sum of the current values of the children, and $\bar{y}$ comprises the new value of the parent of the child i.

15. (Original) The system of Claim 10, wherein:

the organization of data comprises one or more dimensions; and

the parents and children are all members of the same dimension within the organization of data.

16. (Original) The system of Claim 10, wherein:

the organization of data comprises multiple dimensions; and

the parents and children are each associated with multiple dimensions of the organization of data.

17. (Original) The system of Claim 16, wherein the parents and children each represent a storage location within the organization of data that is uniquely identified by the positions of members in two or more of the dimensions.

18. (Original) The system of Claim 16, wherein the organization of data comprises at least two dimensions selected from the group consisting of a time dimension, a product dimension, and a geography dimension.

19. (Previously Presented) Software for allocating data in a hierarchical organization of data, the software embodied in a computer-readable medium and operable to:

determine new values for one or more parents in the organization of data;

determine current values for one or more children in the organization of data, each child being hierarchically related to one or more of the parents;

determine the relationship between each parent and its children;

determine a variation for each child; and

determine a new value for each child by allocating the new values of the parents to the children based on the parent-child relationships, the current values of the children, and either the sum of the variations of the children or a matrix of the variations of the children.

20. (Original) The software of Claim 19, wherein the new values of the parents represent demand forecasts to be allocated to the children.

21. (Original) The software of Claim 19, wherein the variation of each child is calculated using statistical techniques based on the historical variation in the values of the child over a specified time period.

22. (Previously Presented) The software of Claim 19, wherein the new value of each child is determined using the equation:

$$\bar{x}' = \bar{x} + \sum \boldsymbol{R}^T (\boldsymbol{R} \sum \boldsymbol{R}^T)^{-1} (\bar{y} - \boldsymbol{R} \bar{x}),$$

in which $\bar{x}'$ comprises a vector of the new values of the children, $\bar{x}$ comprises a vector of the current values of the children, $\sum$ comprises a matrix of the variations of the children, $\boldsymbol{R}$ comprises a matrix identifying the parent-child relationships, $\boldsymbol{R}^T$ comprises the transpose of $\boldsymbol{R}$, and $\bar{y}$ comprises a vector of the new values of the parents.

23. (Original) The software of Claim 19, wherein the new value of each child is determined using the equation:

$$\bar{x}'_i = \bar{x}_i + \frac{\sigma_{i,i}}{\sum_i \sigma_{i,i}}(\bar{y} - \sum_i \bar{x}_i),$$

in which $\bar{x}'_i$ comprises the new value of the child i, $\bar{x}_i$ comprises the current value associated with a child i, $\sigma_{i,i}$ comprises the variation of the child i, $\sum_i \sigma_{i,i}$ comprises the sum of the variations of the children, $\sum_i \bar{x}_i$ comprises the sum of the current values of the children, and $\bar{y}$ comprises the new value of the parent of the child i.

24. (Original) The software of Claim 19, wherein:

the organization of data comprises one or more dimensions; and

the parents and children are all members of the same dimension within the organization of data.

25. (Original) The software of Claim 19, wherein:

the organization of data comprises multiple dimensions; and

the parents and children are each associated with multiple dimensions of the organization of data.

26. (Original) The software of Claim 25, wherein the parents and children each represent a storage location within the organization of data that is uniquely identified by the positions of members in two or more of the dimensions.

27. (Original) The software of Claim 25, wherein the organization of data comprises at least two dimensions selected from the group consisting of a time dimension, a product dimension, and a geography dimension.

28. (Previously Presented) A system for allocating data in a hierarchical organization of data, comprising:

means for determining new values for one or more parents in the organization of data;

means for determining current values for one or more children in the organization of data, each child being hierarchically related to one or more of the parents;

means for determining the relationship between each parent and its children;

means for determining a variation for each child; and

means for determining a new value for each child by allocating the new values of the parents to the children based on the parent-child relationships, the current values of the children, and either the sum of the variations of the children or a matrix of the variations of the children.

29. (Previously Presented) A computer-implemented method for allocating data in a hierarchical, multi-dimensional organization of data, comprising:

determining demand forecasts for one or more parents in the organization of data;

determining current demand values for one or more children in the organization of data, each child being hierarchically related to one or more of the parents;

determining the relationship between each parent and its children, the parents and children each representing a storage location within the organization of data that is uniquely identified by the positions of members in two or more dimensions of the organization of data;

determining a variation for each child, the variation calculated using statistical techniques based on the historical variation in the values of the child over a specified time period; and

determining a new demand value for each child by allocating the demand forecasts for the parents to the children based on the parent-child relationships, the current demand values of the children, and either the sum of the variations of the children or a matrix of the variations of the children.

30. (Previously Presented) The method of Claim 29, wherein the new demand value of each child is determined using the equation:

$$\bar{x}' = \bar{x} + \Sigma \boldsymbol{R}^T (\boldsymbol{R} \Sigma \boldsymbol{R}^T)^{-1} (\bar{y} - \boldsymbol{R} \bar{x}),$$

in which $\bar{x}'$ comprises a vector of the new demand values of the children, $\bar{x}$ comprises a vector of the current demand values of the children, Σ comprises a matrix of the variations of the children, $\boldsymbol{R}$ comprises a matrix identifying the parent-child relationships, $\boldsymbol{R}^T$ comprises the transpose of $\boldsymbol{R}$, and $\bar{y}$ comprises a vector of the demand forecasts of the parents.

31. (Previously Presented) A system for allocating data in a hierarchical, multi-dimensional organization of data, comprising:

a hierarchical, multi-dimensional organization of data including:

one or more parents having demand associated values; and

a plurality of children having associated demand values, each child being hierarchically related to one or more of the parents;

the parents and children each representing a storage location within the organization of data that is uniquely identified by the positions of members in two or more dimensions of the organization of data; and

a server coupled to the organization of data and operable to:

receive a forecasted demand value for one or more of the parents;

receive a current demand value for one or more of the children;

receive an identification of the relationship between each parent and its children;

receive a variation for each child, the variation calculated using statistical techniques based on the historical variation in the values of the child; and

determine a new demand value for each child by allocating the demand forecasts of the parents to the children based on the parent-child relationships, the current demand values of the children, and either the sum of the variations of the children or a matrix of the variations of the children.

32. (Previously Presented) The system of Claim 31, wherein the new demand value of each child is determined using the equation:

$$\bar{x}' = \bar{x} + \Sigma \boldsymbol{R}^T (\boldsymbol{R} \Sigma \boldsymbol{R}^T)^{-1} (\bar{y} - \boldsymbol{R} \bar{x}),$$

in which $\bar{x}'$ comprises a vector of the new demand values of the children, $\bar{x}$ comprises a vector of the current demand values of the children, Σ comprises a matrix of the variations of the children, $\boldsymbol{R}$ comprises a matrix identifying the parent-child relationships, $\boldsymbol{R}^T$ comprises the transpose of $\boldsymbol{R}$, and $\bar{y}$ comprises a vector of the demand forecasts of the parents.

33. (Previously Presented) Software for allocating data in a hierarchical organization of data, the software embodied in a computer-readable medium and operable to:

determine demand forecasts for one or more parents in the organization of data;

determine current demand values for one or more children in the organization of data, each child being hierarchically related to one or more of the parents;

determine the relationship between each parent and its children, the parents and children each representing a storage location within the organization of data that is uniquely identified by the positions of members in two or more dimensions of the organization of data;

determine a variation for each child, the variation calculated using statistical techniques based on the historical variation in the values of the child; and

determine a new demand value for each child by allocating the demand forecasts for the parents to the children based on the parent-child relationships, the current demand values of the children, and either the sum of the variations of the children or a matrix of the variations of the children.

34. (Previously Presented) The software of Claim 33, wherein the new demand value of each child is determined using the equation:

$$\bar{x}' = \bar{x} + \Sigma \boldsymbol{R}^T (\boldsymbol{R} \Sigma \boldsymbol{R}^T)^{-1} (\bar{y} - \boldsymbol{R} \bar{x}),$$

in which $\bar{x}'$ comprises a vector of the new demand values of the children, $\bar{x}$ comprises a vector of the current demand values of the children, Σ comprises a matrix of the variations of the children, $\boldsymbol{R}$ comprises a matrix identifying the parent-child relationships, $\boldsymbol{R}^T$ comprises the transpose of $\boldsymbol{R}$, and $\bar{y}$ comprises a vector of the demand forecasts of the parents.

Appendix B: Evidence

NONE

Appendix C: Related Proceedings

NONE